In the case where TCI's interest in Cablevision is silent, the calculations in Module I of Table 3A show that TCI has no incentives to foreclose a rival of AMC. The reason is straightforward. Because TCI's interest in AMC is small relative to its interest in cable subscribers, an increase in the price of AMC is more costly to TCI's cable operations than it is beneficial to TCI through its indirect interest in AMC's programming revenues. Consequently, there is a net loss of $1.21 million reported in Module I of Table 3A.

The refinements in Module II generate an additional $34.88 million loss, primarily due to the profits lost as subscribers terminate service. Thus, if TCI were to lose 1% of its controlled subscribers, the total loss experienced by TCI would be about $36.09 million. Alternatively, any incentive that TCI might have to foreclose an AMC rival is eliminated if, as a result of its failure to carry the rival, TCI loses only 0.61% of its subscriber base. In short, TCI's acquisition of a silent financial interest in Cablevision is extremely unlikely to give TCI the incentive to foreclose a rival of AMC.

In the case of partial control, TCI is assumed to deny AMC's rival access to the 33% of Cablevision's subscribers controlled by TCI (see Table 3B). AMC is then assumed to be able to increase its service fees by 10%. As with the case of Discovery, TCI bears only 33% of the losses experienced by Cablevision for every subscriber that terminates its Cablevision service; other Cablevision shareholders bear the other 67% of the subscriber losses.

The Module I losses rise to about $2.41 million in Table 3B versus Table 3A while the Module II losses rise to about $35.21 million. Thus, the total losses from the foreclosure strategy increase to about $37.62 million.

Despite free-riding on the subscriber losses it is able to impose on Cablevision, TCI's incentive to foreclose falls with partial control. TCI need only lose 0.60% of its subscribers to completely offset the gains experienced by AMC from the higher prices. As in Table 3A, the most important reason why the threshold subscriber loss declines slightly is because of TCI's relatively low share of AMC's profits. When AMC increases its price, TCI experiences a cost increase on the 41% of subscribers that it controls (including the Cablevision subscribers it controls). However, it receives only about 25% of the additional profits earned by AMC as a result of the price increase. Thus, TCI tends to lose more through its cable interests than it gains through its programming interests.

Finally, in the very unrealistic case in which TCI's partial interest in Cablevision gives it complete control over Cablevision, denying AMC's rival access to all of Cablevision's subscribers is assumed to permit AMC to raise its price by 20% (see Table 3C). TCI's incentive to foreclose falls further. In Module I, TCI's losses from AMC's higher prices exceed its higher profits from its indirect interest in AMC by about $4.82 million. In Module II, largely as a result of the subscriber losses, TCI experiences an additional loss of about $35.88 million, for a total loss of about $40.70 million. Alternatively, if denying access to AMC's rival would cause TCI to lose 0.58% of its subscribers, TCI would have no incentive to foreclose.

B.4 Summary

To conclude, the examples analyzed in this Appendix strongly suggest that even substantial financial interests that convey some degree of control over the acquired cable system do not result in a significant incentive to foreclose. While there are surely counterexamples, the examples used here are based on existing cable circumstances. Indeed, these examples and any counterexamples serve only to illustrate why simple attribution rules are a highly imperfect substitute for case-by-case analysis.

Table 1
Inputs for Foreclosure Incentive Analysis

Cable System Data

US Multichannel Subscribers (millions) [1]	77.950
TCI Subscribers (millions) [2]	31.180
Cablevision Subscribers (millions) [3]	2.844
Average Cable System Annual Operating Margin ($/subscriber) [4]	327.256

Program Service Data

	Discovery Channel	AMC
Annual Affiliate Fee per Subscriber ($/subscriber) [5]	1.928	2.067
Annual Net Revenue per Subscriber ($/subscriber) [6]	4.921	2.067
Penetration of Multichannel Subscribers [7]	98.374%	90.921%
TCI-Service Subscribers (millions) [8]	30.673	28.349
Cablevision-Service Subscribers (millions) [8]	2.798	2.586

Notes and Sources:

All data are as of December 1997, except US multichannel subscriber data which is as of July 1998.

[1] "Comments of the National Cable Television Association," In the Matter of Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming," July 31, 1998, p. 6.

[2] TCI subscribers assumed to equal 40 percent of US multichannel subscribers.

[3] Paul Kagan Associates, *Cable TV Investor*, February 24, 1998.

[4] Veronis, Suhler & Associates, Communications Industry Forecast, 1997, pp. 156, 160, 177, 179, 185, 189.
Paul Kagan Associates, *Pay TV Newsletter*, April, 30, 1997.
Paul Kagan Associates, *Cable TV Investor*, May 20, 1997.

[5] Paul Kagan Associates, Economics of Basic Cable Networks 1998, pp. 23, 479.

[6] Paul Kagan Associates, Economics of Basic Cable Networks 1998, pp. 23, 483.

[7] Paul Kagan Associates, Economics of Basic Cable Networks 1998, pp. 23, 25.

[8] Derived.

Table 2A
Calculation of the Effect on TCI Annual Profits of the Failure to Carry a Service that Competes with Discovery Channel

	Assumed Parameter Values
Parameters	
Increase in Discovery Revenue per Subscriber Due to Foreclosure	5.000%
Lost Subscribers on Foreclosing Cable Systems	1.000%
TCI Ownership Share in Cablevision	0.000%
TCI Control Share in Cablevision	0.000%

		Parameters and Intermediate Effects	Effects on TCI Profits
I.	**Simplified Arithmetic of Impact on TCI Profits of an Increase in Discovery Affiliate Fee and Advertising Revenue**		
	Average Discovery Affiliate Fee ($/subscriber)	1.928	
	Increase in Discovery Affiliate Fee ($/subscriber)	0.096	
	TCI-Discovery Subscribers (millions)	30.673	
A	Cost to TCI Cable Systems of Discovery Fee Increase ($ millions)		(2.957)
	Discovery Net Revenue ($ millions)	377.392	
	Increase in Discovery Net Revenue ($ millions)	18.870	
	TCI Ownership Share in Discovery	49.000%	
B	TCI Share of Increase in Discovery Revenue ($ millions)		9.246
	Net Profit (Loss) to TCI (A + B)		*6.289*
II.	**Refinements of Simplified Arithmetic**		
	Rival Service Affiliate Fee ($/subscriber)	1.928	
	TCI-Rival Service Subscribers (millions)	30.673	
A	TCI Cable System Avoided Cost from Foreclosing Rival Service ($ millions)		59.149
	TCI Cable System New Operating Margin per Subscriber ($/subscriber)	329.088	
	Lost TCI Subscribers from Foreclosing Rival Service (millions)	0.307	
B	Foregone TCI Cable System Profits from Lost Subscribers ($ millions)		(100.941)
	Average Discovery Revenue After Increase ($/subscriber)	5.168	
	Lost TCI-Discovery Subscribers from Foreclosing Rival Service (millions)	0.307	
	Foregone Discovery Revenue from Lost Subscribers ($ millions)	(1.585)	
	TCI Ownership Share in Discovery	49.000%	
C	TCI Share of Foregone Discovery Revenue from Lost Subscribers ($ millions)		(0.777)
	Net Profit (Loss) to TCI (A + B + C)		*(42.569)*
	Net Change in TCI Profit (Loss) Across Both Modules ($ millions)		**(36.280)**

Sensitivity

	Case Illustrated Above	Case Resulting in No Net Gain to TCI
TCI Change in Profits ($ millions)	(36.280)	0.000
Total TCI and Cablevision Subscribers Lost Due to Foreclosure (millions)	0.307	0.197
Percent Foreclosable Subscribers Lost	1.000%	0.643%

Table 2B
Calculation of the Effect on TCI Annual Profits of the Failure to Carry a Service that Competes with Discovery Channel

	Parameters	Assumed Parameter Values
	Increase in Discovery Revenue per Subscriber Due to Foreclosure	10.000%
	Lost Subscribers on Foreclosing Cable Systems	1.000%
	TCI Ownership Share in Cablevision	33.000%
	TCI Control Share in Cablevision	33.000%

		Parameters and Intermediate Effects	Effects on TCI Profits
I.	**Simplified Arithmetic of Impact on TCI Profits of an Increase in Discovery Affiliate Fee and Advertising Revenue**		
	Average Discovery Affiliate Fee ($/subscriber)	1.928	
	Increase in Discovery Affiliate Fee ($/subscriber)	0.193	
	TCI-Discovery Subscribers (millions)	30.673	
A1	Cost to TCI Cable Systems of Discovery Fee Increase ($ millions)		(5.915)
	Average Discovery Affiliate Fee ($/subscriber)	1.928	
	Increase in Discovery Affiliate Fee ($/subscriber)	0.193	
	Cablevision-Discovery Subscribers (millions)	2.798	
	Cost to Cablevision Cable Systems of Discovery Fee Increase ($ millions)	(0.540)	
A2	TCI Share of Cost to Cablevision ($ millions)		(0.178)
	Discovery Net Revenue ($ millions)	377.392	
	Increase in Discovery Net Revenue ($ millions)	37.739	
	TCI Ownership Share in Discovery	49.000%	
B	TCI Share of Increase in Discovery Revenue ($ millions)		18.492
	Net Profit (Loss) to TCI (A1 + A2 + B)		*12.399*
II.	**Refinements of Simplified Arithmetic**		
	Rival Service Affiliate Fee ($/subscriber)	1.928	
	TCI-Rival Service Subscribers (millions)	30.673	
A1	*TCI Cable System Avoided Cost from Foreclosing Rival Service ($ millions)*		59.149
	Rival Service Affiliate Fee ($/subscriber)	1.928	
	TCI-Controlled Cablevision-Rival Service Subscribers (millions)	0.923	
	Cablevision Cable System Avoided Cost from Foreclosing Rival Service ($ millions)	1.780	
A2	TCI Share of Avoided Cablevision Cost ($ millions)		0.588
	TCI Cable System New Operating Margin per Subscriber ($/subscriber)	328.992	
	Lost TCI Subscribers from Foreclosing Rival Service (millions)	0.307	
B1	Foregone TCI Cable System Profits from Lost Subscribers ($ millions)		(100.912)
	Cablevision Cable System New Operating Margin per Subscriber ($/subscriber)	328.992	
	Lost TCI-Controlled Cablevision Subscribers from Foreclosing Rival Service (millions)	0.009	
	Foregone Cablevision Cable System Profits from Lost Subscribers ($ millions)	(3.037)	
B2	TCI Share of Foregone Cablevision Profits from Lost Subscribers ($ millions)		(1.002)
	Average Discovery Revenue After Increase ($/subscriber)	5.414	
	Lost TCI-Discovery Subscribers from Foreclosing Rival Service (millions)	0.307	
	Lost TCI-Controlled Cablevision-Discovery Subscribers from Foreclosing Rival Service (millions)	0.009	
	Foregone Discovery Revenue from Lost Subscribers ($ millions)	(1.711)	
	TCI Ownership Share in Discovery	49.000%	
C	TCI Share of Foregone Discovery Revenue from Lost Subscribers ($ millions)		(0.838)
	Net Profit (Loss) to TCI (A1 + A2 + B1 + B2 + C)		*(43.016)*
	Net Change in TCI Profit (Loss) Across Both Modules ($ millions)		**(30.616)**

Sensitivity

	Case Illustrated Above	Case Resulting in No Net Gain to TCI
TCI Change in Profits ($ millions)	(30.616)	(0.000)
Total TCI and Cablevision Subscribers Lost Due to Foreclosure (millions)	0.316	0.222
Percent Foreclosable Subscribers Lost	1.000%	0.702%

Table 2C
Calculation of the Effect on TCI Annual Profits of the Failure to Carry a Service that Competes with Discovery Channel

		Assumed Parameter Values
Parameters		
	Increase in Discovery Revenue per Subscriber Due to Foreclosure	20.000%
	Lost Subscribers on Foreclosing Cable Systems	1.000%
	TCI Ownership Share in Cablevision	33.000%
	TCI Control Share in Cablevision	100.000%

		Parameters and Intermediate Effects	Effects on TCI Profits
I.	**Simplified Arithmetic of Impact on TCI Profits of an Increase in Discovery Affiliate Fee and Advertising Revenue**		
	Average Discovery Affiliate Fee ($/subscriber)	1.928	
	Increase in Discovery Affiliate Fee ($/subscriber)	0.386	
	TCI-Discovery Subscribers (millions)	30.673	
A1	Cost to TCI Cable Systems of Discovery Fee Increase ($ millions)		(11.830)
	Average Discovery Affiliate Fee ($/subscriber)	1.928	
	Increase in Discovery Affiliate Fee ($/subscriber)	0.386	
	Cablevision-Discovery Subscribers (millions)	2.798	
	Cost to Cablevision Cable Systems of Discovery Fee Increase ($ millions)	(1.079)	
A2	TCI Share of Cost to Cablevision ($ millions)		(0.356)
	Discovery Net Revenue ($ millions)	377.392	
	Increase in Discovery Net Revenue ($ millions)	75.478	
	TCI Ownership Share in Discovery	49.000%	
B	TCI Share of Increase in Discovery Revenue ($ millions)		36.984
	Net Profit (Loss) to TCI (A1 + A2 + B)		*24.799*
II.	**Refinements of Simplified Arithmetic**		
	Rival Service Affiliate Fee ($/subscriber)	1.928	
	TCI-Rival Service Subscribers (millions)	30.673	
A1	TCI Cable System Avoided Cost from Foreclosing Rival Service ($ millions)		59.149
	Rival Service Affiliate Fee ($/subscriber)	1.928	
	TCI-Controlled Cablevision-Rival Service Subscribers (millions)	2.798	
	Cablevision Cable System Avoided Cost from Foreclosing Rival Service ($ millions)	5.395	
A2	TCI Share of Avoided Cablevision Cost ($ millions)		1.780
	TCI Cable System New Operating Margin per Subscriber ($/subscriber)	328.799	
	Lost TCI Subscribers from Foreclosing Rival Service (millions)	0.307	
B1	Foregone TCI Cable System Profits from Lost Subscribers ($ millions)		(100.853)
	Cablevision Cable System New Operating Margin per Subscriber ($/subscriber)	328.799	
	Lost TCI-Controlled Cablevision Subscribers from Foreclosing Rival Service (millions)	0.028	
	Foregone Cablevision Cable System Profits from Lost Subscribers ($ millions)	(9.199)	
B2	TCI Share of Foregone Cablevision Profits from Lost Subscribers ($ millions)		(3.036)
	Average Discovery Revenue After Increase ($/subscriber)	5.906	
	Lost TCI-Discovery Subscribers from Foreclosing Rival Service (millions)	0.307	
	Lost TCI-Controlled Cablevision-Discovery Subscribers from Foreclosing Rival Service (millions)	0.028	
	Foregone Discovery Revenue from Lost Subscribers ($ millions)	(1.977)	
	TCI Ownership Share in Discovery	49.000%	
C	TCI Share of Foregone Discovery Revenue from Lost Subscribers ($ millions)		(0.969)
	Net Profit (Loss) to TCI (A1 + A2 + B1 + B2 + C)		*(43.927)*
Net Change in TCI Profit (Loss) Across Both Modules ($ millions)			**(19.129)**

Sensitivity

	Case Illustrated Above	Case Resulting in No Net Gain to TCI
TCI Change in Profits ($ millions)	(19.129)	0.000
Total TCI and Cablevision Subscribers Lost Due to Foreclosure (millions)	0.335	0.274
Percent Foreclosable Subscribers Lost	1.000%	0.818%

Table 3A
Calculation of the Effect on TCI Annual Profits of the Failure to Carry a Service that Competes with AMC

		Assumed Parameter Values
Parameters		
	Increase in AMC Revenue per Subscriber Due to Foreclosure	5.000%
	Lost Subscribers on Foreclosing Cable Systems	1.000%
	TCI Ownership Share in Cablevision	33.000%
	TCI Control Share in Cablevision	0.000%

		Parameters and Intermediate Effects	Effects on TCI Profits
I.	**Simplified Arithmetic of Impact on TCI Profits of an Increase in AMC Affiliate Fee and Advertising Revenue**		
	Average AMC Affiliate Fee ($/subscriber)	2.067	
	Increase in AMC Affiliate Fee ($/subscriber)	0.103	
	TCI-AMC Subscribers (millions)	28.349	
A1	Cost to TCI Cable Systems of AMC Fee Increase ($ millions)		(2.930)
	Average AMC Affiliate Fee ($/subscriber)	2.067	
	Increase in AMC Affiliate Fee ($/subscriber)	0.103	
	Cablevision-AMC Subscribers (millions)	2.586	
	Cost to Cablevision Cable Systems of AMC Fee Increase ($ millions)	(0.267)	
A2	TCI Share of Cost to Cablevision ($ millions)		(0.088)
	AMC Net Revenue ($ millions)	146.500	
	Increase in AMC Net Revenue ($ millions)	7.325	
	TCI Ownership Share in AMC	24.750%	
B	TCI Share of Increase in AMC Revenue ($ millions)		1.813
	Net Profit (Loss) to TCI (A1 + A2 + B)		*(1.205)*
II.	**Refinements of Simplified Arithmetic**		
	Rival Service Affiliate Fee ($/subscriber)	2.067	
	TCI-Rival Service Subscribers (millions)	28.349	
A1	TCI Cable System Avoided Cost from Foreclosing Rival Service ($ millions)		58.600
	Rival Service Affiliate Fee ($/subscriber)	2.067	
	TCI-Controlled Cablevision-Rival Service Subscribers (millions)	0.000	
	Cablevision Cable System Avoided Cost from Foreclosing Rival Service ($ millions)	0.000	
A2	TCI Share of Avoided Cablevision Cost ($ millions)		*0.000*
	TCI Cable System New Operating Margin per Subscriber ($/subscriber)	329.220	
	Lost TCI Subscribers from Foreclosing Rival Service (millions)	0.283	
B1	Foregone TCI Cable System Profits from Lost Subscribers ($ millions)		(93.332)
	Cablevision Cable System New Operating Margin per Subscriber ($/subscriber)	329.220	
	Lost TCI-Controlled Cablevision Subscribers from Foreclosing Rival Service (millions)	0.000	
	Foregone Cablevision Cable System Profits from Lost Subscribers ($ millions)	0.000	
B2	TCI Share of Foregone Cablevision Profits from Lost Subscribers ($ millions)		0.000
	Average AMC Revenue After Increase ($/subscriber)	2.170	
	Lost TCI-AMC Subscribers from Foreclosing Rival Service (millions)	0.283	
	Lost TCI-Controlled Cablevision-AMC Subscribers from Foreclosing Rival Service (millions)	0.000	
	Foregone AMC Revenue from Lost Subscribers ($ millions)	(0.615)	
	TCI Ownership Share in AMC	24.750%	
C	TCI Share of Foregone AMC Revenue from Lost Subscribers ($ millions)		(0.152)
	Net Profit (Loss) to TCI (A1 + A2 + B1 + B2 + C)		*(34.884)*
	Net Change in TCI Profit (Loss) Across Both Modules ($ millions)		**(36.089)**

Sensitivity

	Case Illustrated Above	Case Resulting in No Net Gain to TCI
TCI Change in Profits ($ millions)	(36.089)	0.000
Total TCI and Cablevision Subscribers Lost Due to Foreclosure (millions)	0.283	0.174
Percent Foreclosable Subscribers Lost	1.000%	0.614%

Table 3B
Calculation of the Effect on TCI Annual Profits of the Failure to Carry a Service that Competes with AMC

		Assumed Parameter Values	
Parameters			
	Increase in AMC Revenue per Subscriber Due to Foreclosure	10.000%	
	Lost Subscribers on Foreclosing Cable Systems	1.000%	
	TCI Ownership Share in Cablevision	33.000%	
	TCI Control Share in Cablevision	33.000%	
		Parameters and Intermediate Effects	**Effects on TCI Profits**
I.	**Simplified Arithmetic of Impact on TCI Profits of an Increase in AMC Affiliate Fee and Advertising Revenue**		
	Average AMC Affiliate Fee ($/subscriber)	2.067	
	Increase in AMC Affiliate Fee ($/subscriber)	0.207	
	TCI-AMC Subscribers (millions)	28.349	
A1	Cost to TCI Cable Systems of AMC Fee Increase ($ millions)		(5.860)
	Average AMC Affiliate Fee ($/subscriber)	2.067	
	Increase in AMC Affiliate Fee ($/subscriber)	0.207	
	Cablevision-AMC Subscribers (millions)	2.586	
	Cost to Cablevision Cable Systems of AMC Fee Increase ($ millions)	(0.535)	
A2	TCI Share of Cost to Cablevision ($ millions)		(0.176)
	AMC Net Revenue ($ millions)	146.500	
	Increase in AMC Net Revenue ($ millions)	14.650	
	TCI Ownership Share in AMC	24.750%	
B	TCI Share of Increase in AMC Revenue ($ millions)		3.626
	Net Profit (Loss) to TCI (A1 + A2 + B)		*(2.411)*
II.	**Refinements of Simplified Arithmetic**		
	Rival Service Affiliate Fee ($/subscriber)	2.067	
	TCI-Rival Service Subscribers (millions)	28.349	
A1	TCI Cable System Avoided Cost from Foreclosing Rival Service ($ millions)		58.600
	Rival Service Affiliate Fee ($/subscriber)	2.067	
	TCI-Controlled Cablevision-Rival Service Subscribers (millions)	0.853	
	Cablevision Cable System Avoided Cost from Foreclosing Rival Service ($ millions)	1.764	
A2	TCI Share of Avoided Cablevision Cost ($ millions)		0.582
	TCI Cable System New Operating Margin per Subscriber ($/subscriber)	329.117	
	Lost TCI Subscribers from Foreclosing Rival Service (millions)	0.283	
B1	Foregone TCI Cable System Profits from Lost Subscribers ($ millions)		(93.302)
	Cablevision Cable System New Operating Margin per Subscriber ($/subscriber)	329.117	
	Lost TCI-Controlled Cablevision Subscribers from Foreclosing Rival Service (millions)	0.009	
	Foregone Cablevision Cable System Profits from Lost Subscribers ($ millions)	(2.808)	
B2	TCI Share of Foregone Cablevision Profits from Lost Subscribers ($ millions)		(0.927)
	Average AMC Revenue After Increase ($/subscriber)	2.274	
	Lost TCI-AMC Subscribers from Foreclosing Rival Service (millions)	0.283	
	Lost TCI-Controlled Cablevision-AMC Subscribers from Foreclosing Rival Service (millions)	0.009	
	Foregone AMC Revenue from Lost Subscribers ($ millions)	(0.664)	
	TCI Ownership Share in AMC	24.750%	
C	TCI Share of Foregone AMC Revenue from Lost Subscribers ($ millions)		(0.164)
	Net Profit (Loss) to TCI (A1 + A2 + B1 + B2 + C)		*(35.211)*
	Net Change in TCI Profit (Loss) Across Both Modules ($ millions)		**(37.622)**

Sensitivity

	Case Illustrated Above	Case Resulting in No Net Gain to TCI
TCI Change in Profits ($ millions)	(37.622)	0.000
Total TCI and Cablevision Subscribers Lost Due to Foreclosure (millions)	0.292	0.176
Percent Foreclosable Subscribers Lost	1.000%	0.601%

Table 3C
Calculation of the Effect on TCI Annual Profits of the Failure to Carry a Service that Competes with AMC

		Assumed Parameter Values	
Parameters			
	Increase in AMC Revenue per Subscriber Due to Foreclosure	20.000%	
	Lost Subscribers on Foreclosing Cable Systems	1.000%	
	TCI Ownership Share in Cablevision	33.000%	
	TCI Control Share in Cablevision	100.000%	
		Parameters and Intermediate Effects	**Effects on TCI Profits**
I.	**Simplified Arithmetic of Impact on TCI Profits of an Increase in AMC Affiliate Fee and Advertising Revenue**		
	Average AMC Affiliate Fee ($/subscriber)	2.067	
	Increase in AMC Affiliate Fee ($/subscriber)	0.413	
	TCI-AMC Subscribers (millions)	28.349	
A1	Cost to TCI Cable Systems of AMC Fee Increase ($ millions)		(11.720)
	Average AMC Affiliate Fee ($/subscriber)	2.067	
	Increase in AMC Affiliate Fee ($/subscriber)	0.413	
	Cablevision-AMC Subscribers (millions)	2.586	
	Cost to Cablevision Cable Systems of AMC Fee Increase ($ millions)	(1.069)	
A2	TCI Share of Cost to Cablevision ($ millions)		(0.353)
	AMC Net Revenue ($ millions)	146.500	
	Increase in AMC Net Revenue ($ millions)	29.300	
	TCI Ownership Share in AMC	24.750%	
B	TCI Share of Increase in AMC Revenue ($ millions)		7.252
	Net Profit (Loss) to TCI (A1 + A2 + B)		*(4.821)*
II.	**Refinements of Simplified Arithmetic**		
	Rival Service Affiliate Fee ($/subscriber)	2.067	
	TCI-Rival Service Subscribers (millions)	28.349	
A1	TCI Cable System Avoided Cost from Foreclosing Rival Service ($ millions)		58.600
	Rival Service Affiliate Fee ($/subscriber)	2.067	
	TCI-Controlled Cablevision-Rival Service Subscribers (millions)	2.586	
	Cablevision Cable System Avoided Cost from Foreclosing Rival Service ($ millions)	5.345	
A2	TCI Share of Avoided Cablevision Cost ($ millions)		1.764
	TCI Cable System New Operating Margin per Subscriber ($/subscriber)	328.910	
	Lost TCI Subscribers from Foreclosing Rival Service (millions)	0.283	
B1	Foregone TCI Cable System Profits from Lost Subscribers ($ millions)		(93.244)
	Cablevision Cable System New Operating Margin per Subscriber ($/subscriber)	328.910	
	Lost TCI-Controlled Cablevision Subscribers from Foreclosing Rival Service (millions)	0.026	
	Foregone Cablevision Cable System Profits from Lost Subscribers ($ millions)	(8.505)	
B2	TCI Share of Foregone Cablevision Profits from Lost Subscribers ($ millions)		(2.807)
	Average AMC Revenue After Increase ($/subscriber)	2.480	
	Lost TCI-AMC Subscribers from Foreclosing Rival Service (millions)	0.283	
	Lost TCI-Controlled Cablevision-AMC Subscribers from Foreclosing Rival Service (millions)	0.026	
	Foregone AMC Revenue from Lost Subscribers ($ millions)	(0.767)	
	TCI Ownership Share in AMC	24.750%	
C	TCI Share of Foregone AMC Revenue from Lost Subscribers ($ millions)		(0.190)
	Net Profit (Loss) to TCI (A1 + A2 + B1 + B2 + C)		*(35.877)*
	Net Change in TCI Profit (Loss) Across Both Modules ($ millions)		**(40.698)**

Sensitivity

	Case Illustrated Above	Case Resulting in No Net Gain to TCI
TCI Change in Profits ($ millions)	(40.698)	0.000
Total TCI and Cablevision Subscribers Lost Due to Foreclosure (millions)	0.309	0.179
Percent Foreclosable Subscribers Lost	1.000%	0.577%

Appendix C

HOW CROSS-OWNERSHIP MITIGATES DOUBLE-MARGINALIZATION

Appendix C

HOW CROSS-OWNERSHIP MITIGATES DOUBLE-MARGINALIZATION

C.1. Introduction

This appendix explains how partial ownership interests by cable operators in other cable operators can mitigate the double-marginalization problem that arises when the acquiring or the acquired cable operator owns one or more program services. We examine two simple theoretical cases that illustrate this point. First, we consider the effects of an upstream supplier of an input (e.g., a programmer) taking a partial ownership interest in a downstream firm (e.g., a cable operator) that sells the product or service in a final market. Second, we consider the effects of a downstream firm taking a partial ownership interest in an upstream supplier.

For simplicity, we consider an example in which a single upstream firm sells an input used in fixed proportions by a single downstream firm to produce a service. We assume that one unit of the input is used to produce one unit of output. The demand for the downstream firm's service is D(P) where P is the price it charges its customers. The downstream firm's profits are $\pi^d=(P-w)D(P)$ where w is the per-unit price it pays the upstream firm for the service. The upstream firm produces at zero marginal cost and earns profits $\pi^u=wD(P)$.

Pricing decisions are made in the standard two-stage game framework. The upstream firm first sets the input price w, then the downstream firm sets the final price P. Each firm chooses its price to maximize its profits. The

downstream firm does so taking the price set by the upstream firm as given; the upstream firm does so with an understanding of how the input price will affect the downstream firm's pricing incentives.[1]

It is well known that independent, per-unit pricing by successive monopolists results in double-marginalization, which leads to a higher final price than a vertically integrated monopolist would set. The next two subsections show that partial ownership interests can mitigate or eliminate double-marginalization and thereby reduce the final price and increase subscribership.

C.2. Upstream Firm Acquires Partial Interest in a Downstream Firm

Suppose that the owner of the upstream firm takes a silent financial interest of α in the downstream firm. Since the partial interest is silent, the downstream firm's profit objective does not change; it still chooses its price P to maximize its profits π^d. Let P(w) be the downstream firm's optimal price[2] for any given w, and write its maximized profits for any w as $\pi^d(w)=(P(w)-w)D(P(w))$.

The silent financial interest does change the upstream firm's objective because the wholesale price it chooses will affect its share of downstream profits. Let $\pi^u(w)=wD(P(w))$ be the upstream profits conditional on any input price w. The upstream firm's profit objective given its partial interest α in the downstream firm is then $\pi^{u\alpha}(w)=\pi^u(w)+\alpha\pi^d(w)$. We assume that $\pi^{u\alpha}$ is strictly quasi-concave in w.

We now demonstrate that an increase in the upstream firm's silent financial interest in the downstream firm results in lower prices for the input and

[1] Technically, the equilibrium strategies will be subgame perfect.
[2] We assume that P(w) exists and is unique.

the final product. The upstream firm's first order condition for profit maximization is

(1) $$\pi^u_w + \alpha\pi^d_w = 0$$

where subscripts denote derivatives. Totally differentiating (1) with respect to α yields

(2) $$\frac{\partial w}{\partial \alpha} = -\frac{\pi^d_w}{\pi^u_{ww} + \alpha\pi^d_{ww}}$$

which measures how the input price changes when the partial ownership share changes. The denominator of (2) is negative by the assumption that the upstream firm's objective function is strictly quasi-concave. The numerator of (2) is negative by the well known comparative statics result that a monopolist's profit is strictly decreasing in its marginal cost.[3] Thus, $\partial w/\partial\alpha < 0$; i.e., *the input price falls when the upstream firm's silent financial interest in the downstream firm increases.* Since the downstream firm's price is increasing in its marginal cost,[4] the downstream firm's price falls as the input price falls. Thus, *the downstream price falls when the upstream firm's silent financial interest in the downstream firm increases. In particular, any silent financial interest by the upstream firm in*

[3] By the envelope theorem, $\partial\pi^d/\partial w = -D(P(w)) < 0$.

[4] The first order condition for the downstream firm is $D+(P-w)D_P=0$. Totally differentiating with respect to w, we find that $\partial P/\partial w = -D_P/\pi^d_{PP}$ which is positive by the assumption that π^d is strictly quasi-concave.

the downstream firm leads to a lower final price than no partial ownership interest.

Thus far we have assumed that the upstream firm's partial investment is a silent financial interest that confers no control. It is not difficult to see that double marginalization is attenuated further when the upstream firm gains complete control of the downstream firm. In this case the upstream firm will set the downstream price as low as possible consistent with keeping the downstream firm profitable, i.e., P=w. The upstream firm's profits then become

(3) $$wD(P)+\alpha(P-w)D(P) = PD(P)+\alpha(P-P)D(P) = PD(P).$$

Notice that the upstream firm's profit objective, PD(P), is the same as that of a vertically integrated firm. Thus, *effective control over the downstream firm eliminates double-marginizalization, leading to a lower final price.*

C.3. Downstream Firm Acquires a Partial Interest in the Upstream Firm

Next, suppose the downstream firm takes a silent financial interest α in the upstream firm. The downstream firm's profit objective then becomes

$$(P-w)D(P)+\alpha wD(P) = [P-(1-\alpha)w]D(P) = (P-w')D(P)$$

where $w'=(1-\alpha)w$. The downstream firm's profit maximizing price is then P(w'). We will refer to w' as the "ownership-adjusted" input price because it reflects the fact that the downstream firm's effective input price is reduced by the amount of its partial ownership interest in the upstream firm.

Given the downstream firm's pricing decision P(w'), the upstream firm's optimal wholesale price becomes

$$w^{\alpha} = \arg\max_{w} wD(P((1-\alpha)w)) = \arg\max_{w'} \frac{1}{1-\alpha} w' D(P(w'))$$
$$= \frac{1}{1-\alpha} w^{*}.$$

where w* is the input price chosen absent cross-ownership and the notation "argmax" represents the value of w that maximizes the given expressions. The first equality follows from making the substitution w'=(1-α)w. The second equality is true because the solution to a maximization problem does not change when the objective is multiplied by a constant. In words, the effective wholesale price paid by the downstream firm when it has a partial ownership interest of α in the upstream firm is 100α% lower than the price w* that is chosen absent any cross-ownership, i.e., w^{α}=w*/(1-α). This means that the ownership-adjusted price is (1-α)w^{α}=(1-α)w*/(1-α)=w*, or that the ownership-adjusted input price is the same as the input price chosen before the partial ownership interest. This also means that the final price is the same with or without the partial ownership interest. Thus, *a silent financial interest by the downstream firm in the upstream firm does not affect the final price.*

Although a silent financial interest by the downstream firm in the upstream firm does not mitigate double-marginalization, a partial investment that involves control does. To see this, suppose the downstream firm controls the input price. Since its profits are a declining function of the ownership-adjusted price w'=(1-α)w, the downstream firm wants this price to be as low as possible. This occurs when the input price w equals upstream marginal cost, or in this example, when

w=0. But when w=0, the downstream firm's profit objective in setting the final price becomes

$$[P-(1-\alpha)w]D(P) = PD(P),$$

which is the same as the objective of a vertically integrated firm. Thus, *a partial investment by the downstream firm in the upstream firm that confers complete control over the upstream firm eliminates double-marginalization and leads to a lower final price.*

It is not difficult to see that a partial ownership interest by the downstream firm in the upstream firm that confers partial control mitigates double marginalization as well. The idea is that the downstream firm benefits from exerting influence on the upstream firm that causes it to reduce the input price. The lower input price causes the downstream firm to reduce the final price.

TCI

NEWS

FOR IMMEDIATE RELEASE
January 23, 1998
Contacts: Media Relations, LaRae Marsik, (303) 267-5273
Investor Relations, Linda Dill, (303) 267-5048

TCIC AGREES TO ACQUIRE KALAMAZOO, MICHIGAN SYSTEM FROM CABLEVISION

ENGLEWOOD, CO -- TCI Communications, Inc. ("TCIC"), the cable television operating group of Tele-Communications, Inc. ("TCI"), announced today that it has reached an agreement in principle involving the acquisition of the Kalamazoo, Michigan cable system currently owned by Cablevision Systems Corporation ("Cablevision"). The system, serving approximately 50,000 customers in the communities of Kalamazoo, Portage, Comstock Township, Parchment, Cooper Township, Oshtemo Township, and Pavilion Township, will be added to TCIC's existing Michigan service areas. After completing this and other announced pending transactions, TCIC will serve a combined total of over 550,000 customers in the state.

"We are delighted to have reached this agreement with our valued partners at Cablevision, who have been wonderful stewards of these systems," said Leo J. Hindery, Jr., President and Chief Executive Officer of TCIC. "We have a demonstrated commitment to serving customers in the state of Michigan and we look forward to developing a responsive relationship with Kalamazoo and the surrounding communities."

Additional terms of the letter of intent were not disclosed. The transactions are subject to the signing of definitive agreements and to all appropriate regulatory approvals and other consents.

Tele-Communications, Inc. is traded through the TCI Group (TCOMA/TCOMB), the TCI Ventures Group and the Liberty Media Group common stocks. TCI Communications, Inc., Tele-Communications, Inc.'s principal domestic communications subsidiary (which is attributed to the TCI Group), trades its Cumulative Exchangeable Preferred Stock, Series A on the National Market tier of the Nasdaq Stock Market under the symbol TCICP and a special purpose trust of TCIC trades its 8.72% Trust Originated Preferred Securities on the New York Stock Exchange under the symbol TFI/pr and its 10% and 9.72% Trust Preferred Securities on the New York Stock Exchange under the symbols TFII and TFIV, respectively.

Terrace Tower II
5619 DTC Parkway
Englewood, CO 80111-3000

Post Office Box 5630
Denver, CO 80217-5630
(303) 267-5500

TCI

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CABLEVISION SYSTEMS CORPORATION
One Media Crossways
Woodbury, NY 11797

CONTACTS: Charlie Schueler
(516) 393-1399

Susan Pelcher
(516) 393-1961

TCI COMMUNICATIONS, INC.
5619 DTC Parkway
Englewood, CO 80111

CONTACTS: LaRae Marsik,
Media Relations,
(303) 267-5273

Linda Dill,
Investor Relations,
(303) 267-5048

CABLEVISION AND TCIC TRANSACTION TO TRANSFER OWNERSHIP OF CONNECTICUT SYSTEMS SERVING 250,000 CUSTOMERS

WOODBURY, NY AND ENGLEWOOD, CO; JANUARY 27, 1998 -- Cablevision Systems Corp. (ASE:CVC) and TCI Communications, Inc., ("TCIC", NASDAQ: TCOMA), the cable television operating group of Tele-Communications, Inc. ("TCI"), today announced that they have signed a letter of intent for Cablevision to acquire TCIC's Connecticut cable television properties for assets, cash and securities. The purchase will more than double the number of Cablevision's Connecticut households by combining TCIC's 250,000 customers with Cablevision's current operations serving 202,000 customers in the state.

Cablevision has agreed to acquire TCIC's systems in and around Hartford, Vernon, Branford and Lakeville, Connecticut in two separate transactions. In connection with TCIC's previously announced acquisition of Cablevision's Kalamazoo, Michigan system, Cablevision will acquire TCIC's Branford and Lakeville, Connecticut systems through an exchange of assets. The second transaction involves TCIC's transfer of Hartford and Vernon, Connecticut to Cablevision for an additional equity position in the company, bringing TCI's equity stake in Cablevision to approximately 36 percent.

For Cablevision, the acquisition dramatically enhances its cable operations in Connecticut and its focus on system clusters – a strategy which will speed the delivery of advanced telecommunications technology and services to customers. For TCIC, the transaction provides the opportunity to further capitalize on its partnership with Cablevision, while improving service opportunities for its Connecticut customers and enhancing its presence in Southwestern Michigan.

(more)

"This major local investment more than doubles Cablevision's already strong commitment to Connecticut," said Cablevision CEO James L. Dolan. "The marriage of these systems will create the size, financial resources and experienced local management we need to rapidly deploy the next generation of communications service in Connecticut. Customers want choice in local telephone service, and they desire high speed Internet access and the highest quality local and national programming. This transaction enables us to be fully responsive to such interests."

"These agreements bring a host of new opportunities and long-term value to both companies," said Leo J. Hindery, Jr., TCI President. "TCIC's established relationships with Connecticut communities and customers, which have been on the cutting edge of our industry's new technologies, will be thoughtfully built upon by Cablevision. We look forward to our continued partnership with Cablevision through our investment in this exceptional company."

Cablevision envisions a number of undertakings for Connecticut cable customers including continuing the deployment of advanced communications services such as high-speed Internet connections utilizing cable modems, further development of a strong in-state telephony competitor, the roll out of hardware and services to support new video technologies and increasing the scope and resources to expand Connecticut-focused programming like Cablevision's award-winning News12 Connecticut -- Connecticut's only 24 hour television news service.

Cablevision Systems Corporation is one of the nation's leading diversified telecommunications and entertainment companies. As the sixth largest operator of cable television systems, Cablevision's cable division serves households primarily in the New York, Boston and Cleveland metropolitan areas. The company's Rainbow Media Holdings subsidiary owns and manages entertainment, news and sports programming services including Bravo and American Movie Classics. Cablevision's Madison Square Garden L.P., includes the arena complex, the New York Knicks, the New York Rangers, as well as the MSG Network. Its Radio City Productions manages the operations and holds a long-term lease on New York's famed Radio City Music Hall. Cablevision Lightpath, Inc., a wholly owned subsidiary, provides telephone service to more than 850 businesses on Long Island, while Optimum Online offers high-speed online and Internet access via cable modems to customers in New York and Connecticut.

Tele-Communications, Inc. is traded through the TCI Group, the TCI Ventures Group and the Liberty Media Group common stocks. Series A and Series B TCI Group common stock (TCOMA/TCOMB); Series A and Series B TCI Ventures Group common stock (TCIVA/TCIVB); and Series A and Series B Liberty Media Group common stock (LBTYA/LBTYB) are traded on the National Market tier of the Nasdaq Stock Market.

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FOR IMMEDIATE RELEASE
April 17, 1998
Contact: LaRae Marsik, TCI Media Relations, (303) 267-5277

TCIC TO PURCHASE JONES INTERCABLE'S CHICAGO-AREA CABLE SYSTEMS

ENGLEWOOD, CO - TCI Communications, Inc. (TCIC), announced today that it has signed letters of intent with partnerships managed by Jones Intercable, Inc. to purchase their suburban Illinois cable properties, serving approximately 255,000 customers in and around Aurora, Lake County, Lake Zurich, Naperville, Orland Park, Matteson, and Wheaton, Illinois.

"We are excited to add these communities to the foundation that TCIC has established throughout the Chicagoland area," said Leo J. Hindery, Jr., President and CEO of TCIC. "The Chicago marketplace is a significant regional cluster which TCIC serves with continued dedication and pride. We have demonstrated a strong commitment to this region and its residents. With future advancements in our products and ever-increasing customer service in each of our major markets, we hope to continue to be the telecommunications provider of choice."

"This agreement is another step toward our goal of becoming an owned-asset company, rather than primarily a management company," said Glenn R. Jones, Chairman and CEO of Jones Intercable. "It will allow us to concentrate more fully on our owned cable systems in the operating clusters we have built."

A list of the communities included in the agreements is attached.

Additional terms of the letters of intent were not disclosed. The transaction is subject to the signing of definitive agreements and all appropriate regulatory approvals, and is expected to close in early 1999.

Tele-Communications, Inc. is traded through the TCI Group, the TCI Ventures Group and the Liberty Media Group common stocks. The Series A and Series B TCI Group common stocks are traded on the National Market tier of the Nasdaq Stock Market under the symbols of TCOMA and TCOMB, respectively.

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Jones Communities involved in the Jones/TCIC agreements:

- Addison
- Aurora
- Barrington
- Cook County
- Crete
- Deer Park
- Dupage County
- Elgin
- Flossmoor
- Genevea
- Glen Ellyn
- Grayslake
- Hawthorn Woods
- Hazel Crest
- Hoffman Estates
- Indian Creek
- Indian Head Park
- Kane County
- Kendall County
- Kildeer
- La Grange Park
- La Grange
- Lake Barrington
- Lake County
- Lake Zurich
- Lansing
- Libertyville
- Long Grove
- Matteson
- Montgomery
- Mundelein
- Naperville
- North Aurora
- Olympia Fields
- Orland Park
- Oswego
- Park Forest
- Plano
- Richton Park
- Riverside
- Sandwich
- South Elgin
- St. Charles
- Thornton
- University Park
- Vernon Hills
- Warrenville
- Wauconda
- West Chicago
- Western Springs
- Wheaton
- Will County
- Winfield
- Yorkville.

FOR IMMEDIATE RELEASE
April 17, 1998
Contacts: LaRae Marsik, TCI, (303) 267-5277
Jack Pottle, TW Fanch, (303) 756-5600

TW FANCH SIGNS LETTER OF INTENT WITH TCI COMMUNICATIONS TO PURCHASE SELECT SYSTEMS IN THE MID-ATLANTIC REGION

ENGLEWOOD, CO -- TCI Communications, Inc., ("TCIC"), part of Tele-Communications, Inc.'s TCI Group (NASDAQ:TCOMA), and TW Fanch-one Co. ("TW Fanch"), a partnership of Time Warner, Denver-based Fanch Communications, Inc. and the Blackstone Group, announced today that they have signed a letter of intent for TW Fanch to purchase several TCIC cable television properties in Maryland, Ohio, Virginia and West Virginia. The agreement is designed to enhance TW Fanch's existing operations in the Mid-Atlantic region.

Upon completion of the transaction, TCIC's cable operations serving approximately 147,500 customers in the areas of Cumberland, Maryland; Zanesville, Ohio; Wytheville, Virginia; and Beckley, Parkersburg, Princeton and Logan, West Virginia will be transferred to TW Fanch. A specific list of the communities involved is attached.

"This is a tremendously strategic step for TW Fanch as we expand our operations in West Virginia and Ohio," said Bob Fanch, Chairman of TW Fanch. "We look forward to expanding our operations to new customers in these areas as we add to the reach and local presence of our existing systems."

"This transaction will allow TW Fanch to expand its existing cluster of systems within this region and, with its strong management team, will help strengthen and unify the local presence, service and operations within these communities," said Leo J. Hindery, Jr., President and Chief Executive Officer of TCIC. "We have built strong relationships with many of these local communities over the years, and we support TW Fanch's commitment to link their operations and communities more closely, for the benefit of both the customers and employees involved."

Additional terms of the letter of interest were not disclosed. The transactions are subject to the signing of a definitive agreement and to all appropriate regulatory approvals and other consents.

TW Fanch-one Co. is a partnership between Time Warner Cable and Fanch Cablevision of Indiana, L.P. Fanch Cablevision of Indiana, L.P. is an affiliate of Fanch Communications, Inc., a privately held, Denver-based cable television operating company currently managing companies serving over 500,000 customers.

- more -

Tele-Communications, Inc. is traded through the TCI Group (TCOMA/TCOMB), the TCI Ventures Group and the Liberty Media Group common stocks. TCI Communications, Inc., Tele-Communications, Inc.'s principal domestic communications subsidiary (which is attributed to the TCI Group), trades its Cumulative Exchangeable Preferred Stock, Series A on the National Market tier of the Nasdaq Stock Market under the symbol TCICP and a special purpose trust of TCIC trades its 8.72% Trust Originated Preferred Securities on the New York Stock Exchange under the symbol TFI/pr and its 10% and 9.72% Trust Preferred Securities on the New York Stock Exchange under the symbols TFII and TFIV, respectively.

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